Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Recommendations Approved by World Radiocommunication Conference Advisory Committee	)	IB Docket No. 16-185

COMMENTS OF GLOBALSTAR, INC.

Globalstar, Inc. ("Globalstar") hereby comments on the International Bureau's Public Notice on the World Radio Communication Advisory Committee's ("WAC's") draft recommendations for the 2019 World Radio Communication Conference ("WRC-19").[1] Globalstar addresses the competing views put forth in Document WAC/066 (01.10.18), which concerns International Telecommunication Union ("ITU") regulation of radio local area network ("RLAN") operations in the 5150-5250 MHz band. At WRC-19, the United States should adopt the position advocated by Globalstar and Omnispace in View B of this document and propose "no change" to the Radio Regulations for the 5150-5250 MHz band. This approach will help prevent harmful aggregate interference to the mobile satellite service ("MSS") networks and their public safety customers and other users around the world.

I. Globalstar's MSS Network and Business

Globalstar is a leading provider of global mobile satellite voice and data services. In the United States, Globalstar is licensed by the Federal Communications Commission ("Commission") for uplink transmissions (mobile earth stations to satellites) in the Big LEO band at 1610-1618.725

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[1] *International Bureau Seeks Comment on Recommendations Approved by World Radiocommunication Conference Advisory Committee*, Public Notice, IB Docket No. 16-185, DA 18-1017 (Oct. 3, 2018).

MHz, and for downlink transmissions (satellites to mobile earth stations) at 2483.5-2500 MHz.[2] Globalstar's satellites currently communicate with 23 gateway earth stations around the world, each serving an area of approximately 700,000 to 1,000,000 square miles.[3] Globalstar is authorized for feeder uplink transmissions from its gateway earth stations to its space stations at 5096-5250 MHz, and each Globalstar satellite has a feeder uplink antenna that "hears" all transmissions at 5096-5250 MHz (including aggregate RLAN transmissions within that spectrum) within the 7,800 km diameter feeder link coverage area. Globalstar's satellites then translate, amplify, and downlink this traffic to its MSS customers at 2483.5-2500 MHz.

In 2013, Globalstar completed the launch of a $1 billion, second-generation non-geostationary ("NGSO") satellite constellation, and it continues to invest in ground infrastructure upgrades and an expanded line of enterprise, consumer, and government products. Globalstar is dedicated to providing state-of-the-art, mission-critical, and safety-of-life services to over 700,000 consumers, businesses, and governmental and public safety users in over 120 countries around the world, including in remote, unserved, and underserved areas not reached by terrestrial deployments. Overall, utilizing its second-generation constellation and ground facilities, Globalstar continues to provide the highest voice quality, fastest truly mobile data speeds, and most affordable service in the MSS industry.

Globalstar's MSS network provides critical back-up capabilities for public safety personnel during disasters, when terrestrial networks can be rendered inoperable. Public safety entities involved in relief efforts in North America and around the world have relied on Globalstar's satellite services after earthquakes, hurricanes, and other disasters. In addition, over the past decade, Globalstar has

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[2] *Application of Loral/Qualcomm Partnership, L.P. for Authority to Construct, Launch, and Operate Globalstar, a Low Earth Orbit Satellite System, to Provide Mobile Satellite Services in the 1610-1626.5 MHz/2483.5-2500 MHz Bands*, Order and Authorization, 10 FCC Rcd 2333 (1995).

[3] In the United States and its territories, Globalstar currently operates gateway earth stations in Clifton, Texas; Sebring, Florida; Wasilla, Alaska; and Barrio of Las Palmas, Cabo Rojo, Puerto Rico.

focused on the development of affordable, consumer-oriented devices and services that have significant public safety benefits. This "SPOT" family of MSS devices is responsible for initiating thousands of rescues globally since the 2007 introduction of this product.

II. The United States Should Support a Position of "No Change" to the ITU's Radio Regulations for RLAN Operations at 5150-5250 MHz

In View A on WRC-19 Agenda Item 1.16, unlicensed interests urge the United States to propose the same changes to the ITU's Radio Regulations that the Commission adopted in its 2014 order on Unlicensed National Information Infrastructure ("U-NII") operations in the 5150-5250 MHz "U-NII-1" band.[4] In that order, the Commission modified its rules to allow the operation of U-NII-1 access points outdoors and at higher power levels than previously permitted.[5] Globalstar strongly opposes such changes to the ITU's rules for the 5150-5250 MHz band. As explained below and in View B on Agenda Item 1.16, such changes would result in the severe degradation of Globalstar's MSS offerings throughout the world, including emergency communications and services to public safety personnel.

A. The Commission's Adoption of Similar Rule Changes in the *2014 5 GHz Order* is Resulting in Serious Harm to Globalstar's MSS Operations and Customers in North America

In 2014, the Commission for the first time permitted outdoor, higher-power RLAN operations in the United States in the U-NII-1 band at 5150-5250 MHz.[6] Since that order, numerous entities have likely deployed hundreds of thousands – if not millions – of high-power

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4 *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, First Report and Order, 29 FCC Rcd 4127, ¶ 46 (2014) ("*2014 5 GHz Order*").

5 *Id*. ¶ 37.

6 *See* note 4 *supra*.

outdoor RLANs around the country.[7] Every Globalstar satellite "hears" all of these RLAN transmissions in its 5096-5250 MHz feeder uplink band across a constantly moving 7,800 kilometer-wide area on the Earth's surface.

As the Commission acknowledged in the *2014 5 GHz Order*, Globalstar has the technical ability to measure the noise level at its satellite antennas.[8] Since May 2014, Globalstar has performed 573 noise floor measurements from eight different satellites in order to assess the noise floor at 5.1 GHz over North America. From May 2014 until February 2017, Globalstar detected no increase in the noise level. Then, in February 2017, one of its satellites measured a 1 dB increase at 5096-5250 MHz.[9] In March 2017, one of its satellites measured a 2 dB noise rise, and by November 20, 2017, four other satellites had detected a similar 2 dB rise in the noise level. Currently, six of the eight Globalstar satellites involved in this program are measuring a 2 dB noise rise, with the transponders on the other two satellites measuring a 1 dB noise rise. Overall, Globalstar's

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[7] NCTA – The Internet & Television Association has indicated that more than half of cable operators' 19 million access points operate in the U-NII-1 band. *See* Comments of NCTA – The Internet & Television Association, GN Docket No. 17-183, at 5-6 (Oct. 2, 2017); Presentation attached to Letter from Paul Margie, NCTA – The Internet and Television Association, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49, at 2 (Oct. 12, 2016). Despite this expansive U-NII-1 roll-out, only four entities – Comcast Corporation ("Comcast"), Altice USA (previously Cablevision Systems Corporation), Vivint, Inc. ("Vivint"), and Rise Broadband ("Rise") – have filed letters with the Commission to meet their reporting requirements. *See* Letter from David Don, Comcast Corporation, to OET, FCC (Jan. 15, 2015); Letter from Peter Corea, Cablevision Systems Corporation (now Altice USA), to OET, FCC (2015); Letter from Greg Hansen, Vivint, Inc., to OET, FCC (Sept. 18, 2015); Letter from Damon Estep, Rise Broadband, to OET, FCC (Sept. 28, 2017), https://www.fcc.gov/engineering-technology/policy-and-rules-division/general/u-nii-1-band-515-525-ghz-operator-filing.

[8] *2014 5 GHz Order* ¶¶ 38, 46. *See also* Petition for Notice of Inquiry of Globalstar, Inc., RM-11808, at 10-12 (May 21, 2018) ("Petition"); *Globalstar 5 GHz Noise Floor Measurement Description and Current Results* (May 21, 2018), attached as Appendix A to Petition.

[9] Globalstar satellites' feeder uplink antenna transponders measure the noise rise in 1 dB increments. As a result, no noise rise was detectable by these satellites until the increase reached at least 1 dB, and no further noise rise above 1 dB was detectable until that increase reached at least 2 dB. All of Globalstar's noise-level measurements have an accuracy of +/- 0.5 dB.

measurements confirm that the noise level over the United States is now 1 to 2 dB higher than it was when the Commission adopted the *2014 5 GHz Order*.

Globalstar's technical consultant, Roberson and Associates, LLC ("Roberson"), has projected that the 5.1 GHz noise floor rise over North America will continue unabated and could reach extreme levels in the near future, given expected RLAN growth over the next decade. Significantly, unlicensed interests have in effect confirmed that outdoor U-NII-1 RLAN deployments are only in the initial stages and that these outdoor operations will become more intensive in the near future.[10] Roberson predicts that, by 2022, the noise floor at 5170-5250 MHz (the specific band segment in which U-NII-1 RLAN systems operate) will rise by between 4.7 dB and 8.2 dB, compared to the May 2014 noise level.[11] Roberson has further found that unlimited RLAN deployments at 5150-5250 MHz will ultimately occupy an unacceptable percentage of Globalstar's MSS capacity and seriously degrade its MSS offerings. Given the projected noise floor rise, Roberson projects that, by 2022, Globalstar's satellite downlink capacity in affected areas will be reduced by *13% to 35%.*[12] This impact will be felt over an area equivalent to greater than 95% of the contiguous United States. Significantly, U.S.-based outdoor RLAN operations will lead to harmful interference to Globalstar MSS operations not only within the United States, but also in numerous other North and South American countries, all in violation of the Commission's obligations under the treaty-level ITU Radio Regulation, Resolution 229.[13]

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10 *See*, *e.g.*, Opposition of Wi-Fi Alliance, RM-11808, at 3, 5 (July 6, 2018).

11 *See* Roberson and Associates, LLC, *Analysis and Impact of Noise Rise in Feeder Uplinks of Globalstar Mobile Satellite Network*, attached as Exhibit B to Petition, at 31-32. 54 (May 21, 2018) ("May 21 Roberson Analysis").

12 May 21 Roberson Analysis at 38-39.

13 Petition at 3 n.8. *See* Resolution 229, Volume 3, Radio Regulations – Resolutions and Recommendations at 187, Radiocommunication Sector – International Telecommunication Union (Geneva 2012), http://search.itu.int/history/HistoryDigitalCollectionDocLibrary/1.41.48.en.103.pdf

The effects of this MSS capacity reduction will be evident during hurricanes and other natural disaster scenarios, when terrestrial networks are often unavailable, safety-of-life satellite services are in heavy demand, and Globalstar experiences peak traffic levels. In situations where communications are most critical, many users will likely suffer significantly degraded service, including dropped calls, geographic coverage holes, failed call attempts, and impaired data transmissions.[14]

Significantly, all available evidence points to unlimited outdoor RLAN operations as the cause of the 5.1 GHz noise floor rise.[15] Most notably, Globalstar has taken measurements across the world and has found a substantial rise in the noise floor *only over North America*. Globalstar's extensive measurements have shown no noise over Europe, Australia, Mexico and Central America, or "blue ocean," where outdoor RLAN operations are either not permitted or do not occur.[16] In addition, Roberson has systematically assessed other potential causes of the noise rise

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("ITU Resolution 229"). The noise rise in Globalstar's uplink spectrum will cause MSS subscriber capacity reductions and degradation of service in the following countries in North America, Central America, South America, and the Caribbean: Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Curacao, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Peru, Puerto Rico, Saint Eustatius, Saint Kitts and Nevis, Saint Lucia, Saint Vincent, Suriname, Trinidad and Tobago, United States, and Venezuela.

14 Petition at 17; May 21 Roberson Analysis at 45-46.

15 *See, e.g.,* Consolidated Reply of Globalstar, Inc., RM-11808, at 6-11 (July 23, 2018) ("Consolidated Reply").

16 Consolidated Reply at 6-8. The noise floor rise over North America is not due to RLAN activity in adjacent or nearby countries. Globalstar has found no noise floor rise when its satellites are in view of Mexico, Central America, and the northern portion of South America, but not the United States. While Globalstar is unable to isolate and take measurements of Canada due to the inclination of its orbital planes, there is no basis to believe that the interference is due to Canadian operations. Unlike the Commission in the United States, Innovation, Science, and Economic Development Canada ("ISED") adopted a strict licensing regime for outdoor, higher power U-NII-1 deployments in 2017, and the few licenses granted so far under that framework do not transmit a significant amount of additional noise into the 5.1 GHz band. *See Decision on the Technical and*

and ruled them out. Neither other RF operations at 5.1 GHz nor internal system issues could be responsible for this noise rise.[17]

In the *2014 5 GHz Order*, the Commission recognized Globalstar's right to protection from harmful interference from unlicensed operations, and stated that "should harmful interference to [Globalstar's] licensed services in this band occur," "corrective action" will be required.[18] Given this Commission assurance and its compelling empirical evidence, Globalstar in May 2018 petitioned the Commission to issue a Notice of Inquiry regarding the viability of continued spectrum sharing between its licensed MSS operations and outdoor RLAN systems in this band.[19] Globalstar's Petition was opposed by many of the same parties that now support View A on Agenda Item 1.16, but these opponents have provided no data of their own regarding the noise floor rise at 5.1 GHz and have failed to identify any other plausible cause of this interference. Globalstar continues to urge the Commission to move forward expeditiously with a full and thorough investigation of the noise floor rise at 5.1 GHz and the causal role of U.S. outdoor RLAN operations.[20]

Policy Framework for Radio Local Area Network Devices Operating in the 5150-5250 MHz Frequency Band, Innovation, Science and Economic Development Canada, SMSE-013-17 (May 2017), https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/SMSE-013-17-decision-5150-eng.pdf/$file/SMSE-013-17-decision-5150-eng.pdf.

17 *See* Consolidated Reply at 10-11; May 21 Roberson Analysis at 48-53.

18 *2014 5 GHz Order* ¶¶ *38, 46.*

19 *See* note 8 *supra*.

20 Globalstar's uncontroverted evidence of harmful aggregate interference to its Big LEO MSS operations raises concerns similar to aggregate interference issues arising in several other frequency bands where the Commission is considering spectrum sharing between new terrestrial wireless systems and existing satellite operations. Sirius XM Radio, Inc. has described at length its concerns regarding harmful aggregate interference from the potential deployment of unlicensed terrestrial transmitters at 7025-7075 MHz to its sole feeder link spectrum for its licensed satellite digital audio radio service. *See* Comments of Sirius XM Radio Inc., RM-11808 (July 6, 2018); Letter from Karis Hastings, Counsel for Sirius XM Radio Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17- 183 (June 22, 2018). In addition, in its July 2017 Notice of Inquiry on mid-band spectrum, the Commission noted that, in considering unlicensed use of the 5.925-6.425 GHz band, it would have to consider the potential threat of aggregate harmful interference from large numbers of unlicensed

B. Adoption of the Rule Changes Described in View A Will Lead to Severe Harmful Aggregate Interference to Globalstar's MSS Network Around the World

If the United States supports the changes to ITU Radio Regulations described in View A and such rule modifications are adopted at WRC-19, this action will encourage other national administrations to adopt rules authorizing unlimited outdoor RLAN operations. The resulting global spread of outdoor RLAN systems at 5.1 GHz will cause serious harm to Globalstar's MSS business by greatly expanding the geographic area over which Globalstar experiences a substantial noise floor rise in its feeder uplink spectrum. In this scenario, Globalstar will suffer harmful aggregate interference to its MSS offerings and degraded service to public safety customers and other MSS users in additional regions around the world. Furthermore, if Mexico, Canada, and other nations adjacent to or near the United States permit unlimited outdoor RLAN deployments at 5.1 GHz, those outdoor operations will intensify the harm to Globalstar MSS *within* the United States (as well as in Mexico, Canada, and other nearby countries), since Globalstar satellites passing over North America and serving the United States will "hear" outdoor RLAN transmissions in such countries.

As the Commission is aware, the issue of outdoor RLAN operations at 5.1 GHz has already been addressed within ITU-R Working Party 5A ("WP5A") for more than a year, as part of international preparatory efforts on WRC-19 Agenda Item 1.16. The United States has presented contributions to the WP5A – prepared by the same parties that authored View A and oppose the Petition – that claim that outdoor RLAN operations at 5.1 GHz will cause no harmful interference to Globalstar's MSS network. The U.S. delegation currently stands alone, however, as the only national

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devices to satellite receivers operating in that band. *Expanding Flexible Use in Mid- Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373, ¶ 29 (2017). Meanwhile, in its Spectrum Frontiers rulemaking proceeding, the Commission in 2017 established a docket to collect further information regarding the potential impact of terrestrial wireless device deployment on satellite networks in the 28 GHz band. *Docket Established for 28 GHz Aggregate Interference Analysis*, Public Notice, GN Docket No. 17-171 (rel. June 21, 2017). *See also* Comments of the Satellite Industry Association, RM-11808 (July 6, 2018).

administration that supports incorporating the main elements of the Commission's U-NII-1 framework into the ITU's Radio Regulations. Notably, the U.S. WP5A contribution has faced significant criticism from multiple sector members within WP5A.[21] Technical filings into the working group from Globalstar, France, Russia, China, and Japan all indicate that unlimited outdoor U-NII-1 operations will cause a substantial noise floor rise at 5 GHz and harmful aggregate interference to Globalstar's licensed MSS operations.[22] Additional countries have also expressed concern and skepticism regarding the U.S. simulation.

In the face of this international opposition and Globalstar's empirical evidence of the 5.1 GHz noise floor rise, the Commission and the United States should reverse course on this critical issue of harmful aggregate interference to licensed satellite services. First, the Commission should grant Globalstar's Petition and issue a Notice of Inquiry in order to develop a comprehensive factual record on the noise rise at 5.1 GHz and the causal role of outdoor RLAN operations in this harmful

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[21] In its Consolidated Reply, Globalstar's technical consultant Roberson demonstrated that the assumptions that form the basis of the U.S. technical contribution to the WP5A are unfounded. *See* Consolidated Reply at 17-18; Roberson and Associates, LLC, *Technical Analysis of Comments to Globalstar Petition*, attached as Exhibit A to Consolidated Reply, at 14-17 (July 23, 2018). The U.S. contribution underestimates the power level for outdoor RLANs, for instance, even assuming an average weighted outdoor power level that is significantly lower than the average access point power for indoor devices. The U.S. document also mistakenly assumes, among other things, that the noise rise at 5.1 GHz will only occur in the United States, that this interference will affect only one satellite at a time, that signal polarization will reduce the level of this interference, and that the degradation to Globalstar MSS should be discounted by the fraction of its satellite's global orbit that is spent over the United States.

[22] None of the regional reporting organizations around the world preparing for WRC-19 has taken a preliminary view supporting the U.S. position in the WP5A. These organizations include, among others, the Asia-Pacific Telecommunity (preliminary view favoring the protection of incumbent services at 5150-5250 MHz without any unacceptable constraints on those services), the European Conference of Postal and Telecommunications Administrations (CEPT) (preliminary view that relaxation of the outdoor RLAN restriction at 5150-5250 MHz would affect the operation of MSS feeder links), and the Regional Commonwealth in the Field of Communications (preliminary view that RLAN operations at 5150-5250 MHz should be consistent with existing ITU Radio Regulations conditions, since ITU-R studies conducted so far have not demonstrated successful sharing between outdoor RLANs and incumbent operations).

aggregate interference. Second, in its upcoming consultations with the U.S. Department of State and NTIA, the Commission should advocate for U.S. adoption of the position described in View B of Document WAC/066. Ultimately, the United States should propose "no change" to the ITU's Radio Regulations for the 5150-5250 MHz band, and should also withdraw its existing technical submission to WP5A or substantially revise it to provide a more accurate contribution.

These steps will help protect Globalstar's MSS network and its public safety users and other customers from harmful aggregate interference in North America and around the world. These actions will also demonstrate the United States' commitment to sound science in administering spectrum, thus enhancing the United States' credibility before the ITU. In contrast, ignoring real-world interference data would give the impression that the Commission and United States merely seek to advance a specific agenda regardless of contrary evidence.

III. Conclusion

Globalstar urges the Commission to advocate that the United States adopt the position described in View B and propose "no change" to the Radio Regulations for the 5150-5250 MHz band at WRC-19. This approach will help prevent harmful aggregate interference to Globalstar's global MSS network and its public safety customers and other users around the world.

Respectfully submitted,

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October 17, 2018